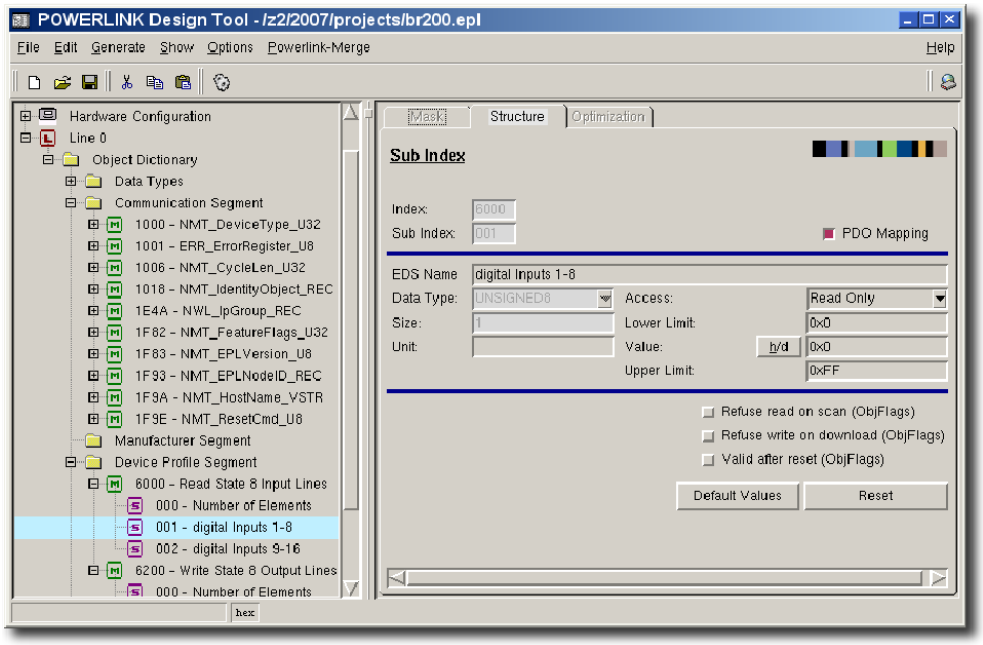
POWERLINK Design Tool
POWERLINK XDD Editor
User Manual



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© 2013 *port* GmbH
Regensburger Straße 7
D-06132 Halle
Tel. +49 345 - 777 55 0
Fax. +49 345 - 777 55 20
E-Mail service@port.de
Internet http://www.port.de

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1. Introduction

1.1. Product Overview

The POWERLINK Design Tool of *port* is a software tool for the development of Ethernet POWERLINK applications (devices). It manages device data bases from which an Object Dictionary, configuration and initialization files in C-code, a XML description and a HTML-documentation are created automatically. Furthermore the driver packages can be configured by the POWERLINK Design Tool and several hardware configurations can be managed within one project.
With the POWERLINK Design Tool an instrument is available which frees the developer of error-prone activities repeating itself. It ensures consistency of implemented functionality, and device documentation. In the scope of delivery a data base with the Ethernet POWERLINK communication profiles are contained. Profile databases are optionally available for various device profiles, for example digital I/O devices according to CiA-401 or drives according to CiA-402.
The created Object Dictionary supports numerous options of the Ethernet POWERLINK library from *port*. A tree representation of all implemented parameters and data eases the maintenance of device software. With the POWERLINK Design Tool the beginning with the Ethernet POWERLINK protocol is less difficult and the development of a device is accelerated.

1.2. Product Delivery

The scope of delivery of the POWERLINK Design Tool:

- User Manual
- software for POWERLINK Design Tool
- data bases for device profiles (optional)

All components are available for download.

This manual also covers the POWERLINK XDD Editor. For users of the POWERLINK XDD Editor some masks and generated files are not available. It is stated in each section of the manual if the information is applicable only for the POWERLINK Design Tool or also for the POWERLINK XDD Editor.

1.3. System requirements

The POWERLINK Design Tool runs on PC's with Microsoft Windows™ or Linux.

Operating System:	Windows 2000, Windows XP, Vista, Windows 7, Linux
Processor:	Pentium IV or later
RAM:	512 MByte
Hard-disk Space:	45 MByte

1.4. Installation

The installation is controlled by menus. For this purpose, unpack the zip-file and start **setup.exe** on Windows™ resp. setup.sh on Linux. After this installation you will find the following directory structure.

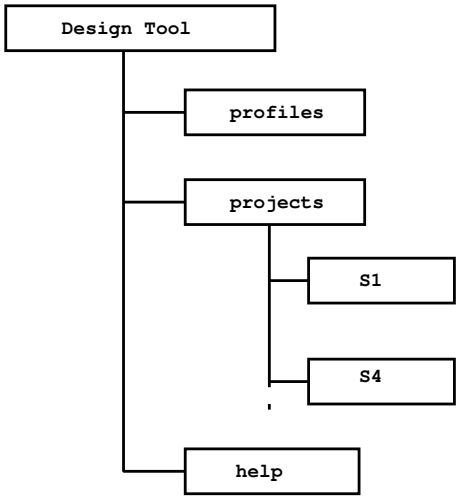


Figure 1, Directory structure of the POWERLINK Design Tool

The directory **projects** contains delivered example projects. For each project a separate directory is recommended. The data bases are in the directory **profiles** for the communication profiles and the Ethernet POWERLINK device profiles. In this directory own profiles can also be generated. The directory **help** serves internal purposes.

After an installation on a Windows™ system the POWERLINK Design Tool can be started by the icon on the desktop or via the start menu.

1.5. Support by *port*

The senior engineers at port support the user by a telephone hot-line and by training courses. Additionally the user can have consultations in the whole field of POWERLINK e.g. network planning, network configuration, message distribution, selection of devices and Ethernet POWERLINK Profile implementations.

Please ask at our email address

E-mail: **service@port.de**

phone: **+49 345 777 55 - 0**

Fax: **+49 345 777 55 - 20**

The engineers at *port* react as soon as possible to your message.

2. Usage of the POWERLINK Design Tool

The POWERLINK Design Tool is controlled via menus, toolbars, treeviews and masks.

2.1. Main menu

The Main menu consists of the following entries:

File — Via the menu option *File* the projects are created, loaded and closed. Further, in this menu the program can be terminated.

Edit — The menu options below *Edit* are meant to copy, cut or paste objects in the object dictionary.

Generate — By selecting the menu option *Generate all Files* within the menu *Generate* the Object Dictionary and the configuration file **pl_conf.h** is generated. If *Generate Documentation* is selected, the documentation in HTML and as plain text will be generated.

Show — Via the menu option *Show* all the generated files can be viewed. The HTML Documentation is displayed with the standard browser.

Options — The *Options* menu organizes the options for the following:

- Generation of electronic device descriptions
- Default selection of mask or structure view for objects.
- Object description structures
- object.c generation
- Font configuration

View options are saved user-specific in the registry (or in a .rc file under Linux) and generation options are saved project-specific in the project file.

Help — In the *Help* menu the help for the current mask or the manual can be viewed. It is shown in the standard browser.

Figure 2, Toolbar

The toolbar below the menu provides a fast access to the following functions: new project, open, save, cut, copy, paste, generate, add new service objects and query new releases.

2.2. Object tree

The object tree is central administrative element for all Ethernet POWERLINK entities as well as all further device parameters and for the hardware configurations. It consists of branches for the global device parameters, branches for the hardware configurations, and

the branch for the supported POWERLINK line. The global ESI/EDS resp. XDD parameters are parameters such as manufacturer name and product designation which are identical for every POWERLINK line.

The individual line entries are split into:

- EDS/XDD[1] settings
- Standard settings (Kind of node and optimization)
- Object dictionary

2.2.1. Hardware configurations

The POWERLINK Design Tool can manage several hardware configurations.
A hardware configuration consists of:

- CPU Settings
  Choice and configuration of the CPU or the operating system
- Compiler Settings
  Choice and configuration of the used compiler

By setting the hardware configuration, defines in the file **pl_conf.h** are set that configure the Driver Package.

2.2.2. Object dictionary

The object dictionary is divided into different branches for the separate segments.

- data types (Indices $0001_h - 025F_h$)
- communication data (Indices $1000_h - 1FFF_h$)
- manufacturer specific data (Indices $2000_h - 5FFF_h$)
- standardized device profile segment data (Indices $6000_h - 9FFF_h$ in blocks of 800_h)
- range for DS 405 devices (Indices $A000_h - AFFF_h$)
- reserved area $B000_h - FFFF_h$

The division of the area for standardized device profiles into blocks of 800_h was carried out under special regard to the multi device profile. Operations, as doubling identical segments, can be implemented simply by the representation of every device profile as a separate segment.

The individual branches of the object dictionary contain the Ethernet POWERLINK objects. These entities are in turn divided into their sub-index elements.

On activation of the individual components in the tree, action menus are displayed in the right frame. e.g. for the data import or the accordant object forms.

2.3. Action menus

The action menus differ for every branch of the object tree. Menus are available for:

- operations for the hardware settings

[1] XDD ... XML Device Description (modern EDS replacement)

- operations referring to one POWERLINK line
- operations referring to the object dictionary
- operations referring to communication parameters
- operations referring to manufacturer specific parameters
- operations referring to device profile parameters

Hardware configuration can be:

- added,
- copied,
- deleted,
- imported and exported.

One can execute for the individual POWERLINK lines:

- adding a new line
- deleting the whole POWERLINK line

For the object dictionary the following actions are available:

- data import from profile files
- data import from an EDS or XDD file
- data export to profile files

One can execute for the segment with communication parameters:

- data import from files (profile or EDS/XDD)
- data export to profile files
- creating of new objects (indices)
- creating of new communication service objects

The vendor-specific segment has action buttons for:

- data import from files (profile or EDS/XDD)
- data export to profile files
- creating new objects (indices)

For the device profile segment the following actions are possible:

- data import from files (profile or EDS/XDD)
- data export to profile files
- creating new objects (indices)
- creating of a sub segment

For sub segments the following actions are available:

- data import from files (profile or EDS/XDD)
- data export to profile files
- creating new objects (indices)

- configuration of the sub segment

2.4. Forms

Forms and input masks simplify the data input. Additionally to the following documentation there is a online help for each mask available about <F1>.

2.4.1. General Settings

The general settings are meant to define global device settings. With these settings the Ethernet POWERLINK library is configured with the help of the file **pl_conf.h.**

2.4.2. General EDS/ESI/XDD settings

The global EDS/ESI/XDD form is used for processing all device global entities, that are device, manufacturer and ordering data.

The CharacteristicsList below is a list of the device characteristics. These characteristics are pairs of keys and values and are only written to the XDD file.

The Device Description Entries defined by the POWERLINK standard are settings that describe the device. These settings are solely written to the XDD file.

By the Static Error Field the meaning of the manufacturer specific error bits of a POWERLINK device can be described. These settings are solely written to the XDD file.

2.4.3. Advanced configuration

This mask provides access to special user defines in the configuration file **pl_conf.h**. This file is included in all Ethernet POWERLINK-files and should be included in every Ethernet POWERLINK-related project file. So compiler directives changed here, will affect the whole project.
Please enter valid C code like e.g.

```
#define CONFIG_BIG_RAM_VERSION 1
/* undefine printf */
#define PRINTF
```

Be carefully with these settings.

2.4.4. Hardware configurations

A hardware configuration can be renamed, duplicated, deleted, imported and exported by its action menu. The active configuration is marked with a pair of asterisks (*) in the project tree.

The parameters of the sub sections are explained in the context help for each mask.

2.4.5. Mask view

These forms are a wizard for the communication parameters. In this way, the input of the parameters is facilitated since the bit values coded are converted into text outputs. Contiguous entities are also parameterized transparently for the operator. Please regard that

the mask view is only available for some objects.

2.4.6. Structure view

The structure view is the universal editor with that all entity parameters can be changed. It is distinguished into a view for the index parameters and one for the sub-index parameters.

Name	Description
Index	Number of index (hexadecimal)
Data Type	data type according to POWERLINK
Object Code	Kind of object according to POWERLINK specification: allowed values: Variable, Array, Record, Domain
Object name	name of the object in XDD/EDS/ESI file
Description	description of the object for the documentation and for the parameter description in XDD files

Table 1, Elements of the structure view for indices

The data type and the object code are fixed for communication objects in the object range 1000_h to $1FFF_h$ to be compliant to the specification.

Name	Description	Lib	EDS	XDD	Doc
Index	Number of index (hexadecimal)	x	x	x	x
Sub-Index	number of sub-index (decimal)	x	x	x	x
PDO-Mapping	if selected, the object can be mapped to a PDO	x	x	x	x
EDS-Name	EDS name for sub-index (only relevant to arrays and records)		x	x	x
Unit	measurement unit of the object				x
Access	access permissions seen from POWERLINK	x	x	x	x
Data Type	type of object	x	x	x	x
Size	size of object in Bytes	x			
Value	default value of the variable	x	x	x	x
Lower Limit	lower limit for numerical values	x	x	x	x
Upper Limit	upper limit for numerical values	x	x	x	x
DefaultValue in EDS*	Write default value to EDSfile		x	x	
Limits in EDS*	Write limit to EDS file		x	x	
Refuse read on scan*	Correspoding ObjFlags setting in EDS/XDD files		x	x	
Refuse write on download*	Correspoding ObjFlags setting in EDS/XDD files		x	x	
Valid after reset*	Correspoding ObjFlags setting in XDD files			x	

Table 2, Elements of the structure view for Sub indices

All items marked with an asterik (*) are rarely used and can be hidden via "Options → View Options → Hide EDS/XDD flags" .

Within the *Object Name* entries internal %-variables can be used. They will be replaced with the their current value at generation. E.g. %s stores the value of the current sub-index and an XDD name like "Output %s" will be replaced with "Output 0", "Output 1" ... or "Output 254". With these substitutions it becomes much more easier to copy or duplicate objects. All %-variables are described in section *%-variables* in chapter 4.7.

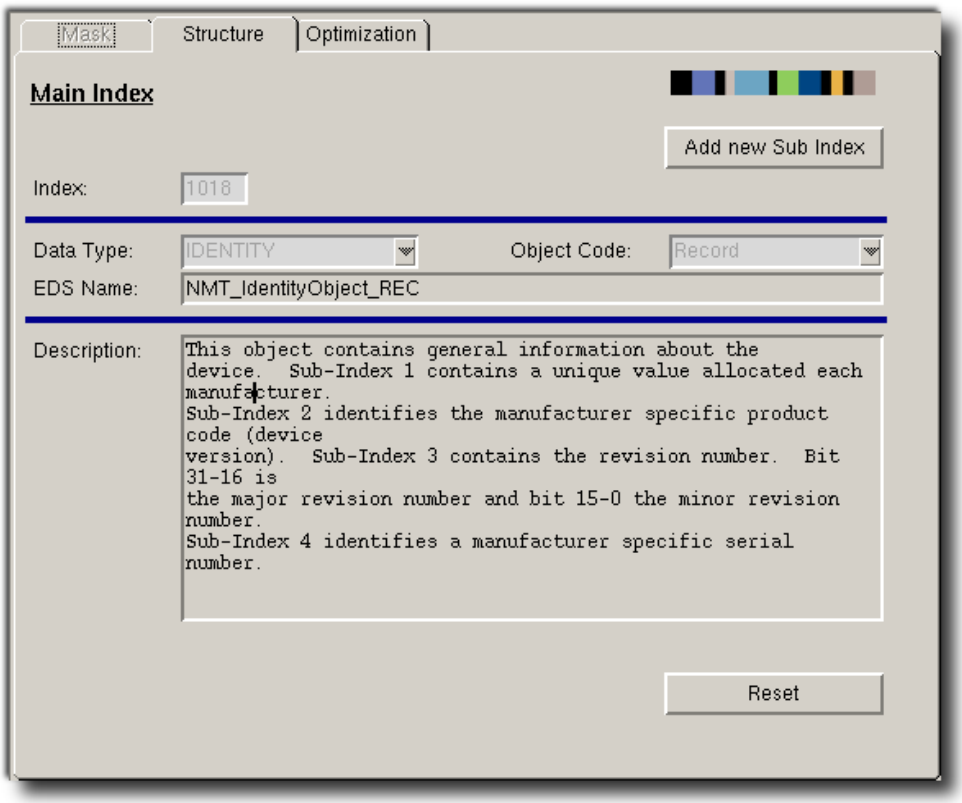

Mask
Structure
Optimization
Main Index
Add new Sub Index
Index:
1018
Data Type:
IDENTITY
Object Code:
Record
EDS Name:
NMT_IdentityObject_REC
Description:
This object contains general information about the device. Sub-Index 1 contains a unique value allocated each manufacturer.
Sub-Index 2 identifies the manufacturer specific product code (device version). Sub-Index 3 contains the revision number. Bit 31-16 is the major revision number and bit 15-0 the minor revision number.
Sub-Index 4 identifies a manufacturer specific serial number.
Reset

Figure 4, structure view of an object

2.5. Program control

The operation of the entire program is done mostly with the mouse. Changed values are taken over only at leaving of the mask. E.g. continuous actions such as computation of new sizes during type variation.

Modifications at a mask can be reset before the mask has been left by pressing the button "Reset". If default values are available for a mask, these values can be loaded by the button "Default".

3. File structure

3.1. Project structure

3.1.1. Project file

All data of an project are stored in the project file. Nevertheless it is useful to have a directory for every project, because the generated files will be stored in the project directory.

The directory 'projects' under the program directory contains some example projects.

3.1.2. Generated files

The generated files are described in table 3.

File	Description
objects.h	Object dictionary
pl_conf.h	configuration file for the library (C code)
<projectName>.eds	generated EDS file for a POWERLINK line
<projectName>.xdd	generated XDD file for a POWERLINK line in XML format
<projectName>.txt	description file for the Ethernet POWERLINK Device Monitor
<projectName>_docu.txt	documentation as text for implemented objects
<projectName>.html	documentation in html for implemented objects
generate.err	information file that contains error and warning messages

Table 3, Generated files

The generates the XDD file, the EDS file and as well the documentation of the object dictionary. C source code is not generated by the .
After generation the files, the object dictionary for the Ethernet POWERLINK source library and a documentation are available. If errors occurred, the files have not been generated and the errors are listed in **generate.err**

3.2. Profile files

Profile files contain parts of an object dictionary with the objects and their attributes. The POWERLINK Design Tool is delivered with a profile, that contains all communication objects according to the communication profiles. If communication objects are set up with the POWERLINK Design Tool, the entries will be loaded automatically from this profile. Additionally to the communication object data base, profile files for other Ethernet POWERLINK device profiles are available from *port*. By means of these profiles standard applications can be implemented in shortest time.

For demonstration purpose some device profile data bases are delivered with the POWERLINK Design Tool. Objects from such a device profile data base can be imported, but without a valid license for this data base the output cannot be created. To order a license

for a device profile please contact service@port.de ⟨service@port.de⟩.

If parts of a project are to be used in later projects, the data can be exported into a separate file.

4. Project editing

This chapter describes the working flow for creating and editing projects. The order of the flow is not mandatory, but very useful. Basic parameter like the number of POWERLINK lines and the kind of the device (Controlled Node or Managing Node) should be clear at the beginning of the development. The necessary steps are the following:

- configuration of global parameter
- configuration of global ESI resp. EDS parameter
- configuration of the hardware settings
- configuration of the Device Description Entries[2]
- configuration of the Static Error Bit Fields
- configuration of standard and additional settings
- definition of application variables
- parameterization of application variables
- definition of communication variables
- parameterization of communication variables
- optimization of each object if needed
- generation of outputs

4.1. Beginning a project

A project is created by the menu *File* → *New Project*.
Existing projects are opened by the button *Open Project* or the menu *File*.
Each POWERLINK line can be preset with data from a profile or an EDS file.

4.2. Hardware configuration

At first the target hardware has to be configured. The most important decision is to choose a CPU resp. an operating system.
These configuration files (`conf_xxxx.h`) can be imported via "Import Configuration".

If the CPU is set, the other CPU settings are set to CPU-specific default values. These default values are suitable in the majority of cases. At *Compiler Settings* the used compiler can be selected.

If the application shall be used on different hardware plattforms, more than one hardware configuration can be created. If no configuration is marked as active, the define `CONFIG_USE_TARGET_x` must be set to 1 in the makefile or in the compiler.

[2] The following DDEs are set by the Design Tool, if "Options → Overwrite Dev Desc Entries" is active: D_PDO_RPDOChannels_U16, D_PDO_RPDOOverallObjects_U16, D_PDO_TPDOOverallObjects_U16, D_NMT_ProductCode_U32 & D_NMT_RevisionNo_U32

4.3. Application variables

Definition of application variables is the creation of objects with indices in the range of $2000_h - 5FFF_h$ for manufacturer specific profiles or in the range of $6000_h - 9FFF_h$ for standardized device profile objects. There are two ways for the definition:

- loading from a profile
- creation by hand

The first way is easier. Certain objects can be selected by means of their index from an profile. Databases for the standardized Ethernet POWERLINK device profiles are available from *port*. If a database doesn't exist yet, all entries can be created by hand. It is distinguished in parameter for the index and for parameter describing the sub-index.
The index parameter defines the structure of the variable. That means their type, kind (Variable, Array, Record, Domain), the number of sub-indices and an object name. Furthermore the variable can be commented. This comment will be a part of the documentation for this object. The parameters for sub-indices contain an object name for record or array members, size and type and access permissions. For each a unit can be assigned. If application-specific data types for records are used, they have to be defined in the data type section of the object directory in advance of their usage.

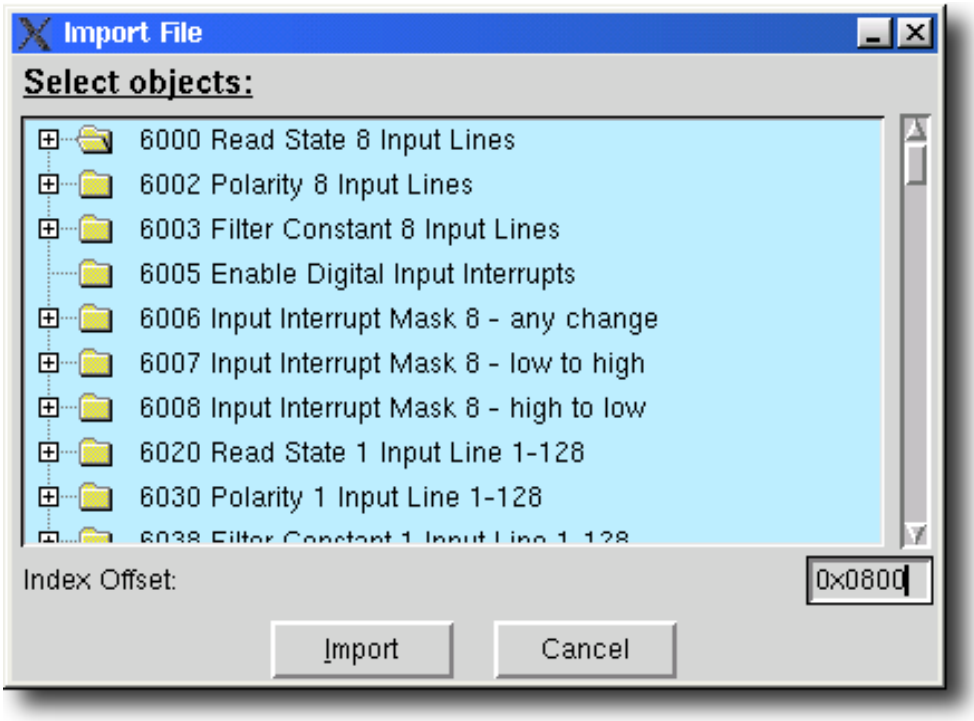

Import File
Select objects:
6000 Read State 8 Input Lines
6002 Polarity 8 Input Lines
6003 Filter Constant 8 Input Lines
6005 Enable Digital Input Interrupts
6006 Input Interrupt Mask 8 - any change
6007 Input Interrupt Mask 8 - low to high
6008 Input Interrupt Mask 8 - high to low
6020 Read State 1 Input Line 1-128
6030 Polarity 1 Input Line 1-128
Index Offset:
0x0800
Import
Cancel

Figure 7, import mask for profiles

4.3.1. Parameterization of application variables

The parameterization of application variables is done in the structure view for the sub-index elements.

4.4. Communication variables

For definition of communication variables the same mechanism is possible as described for the application variables. Additionally the necessary data are loaded from the communication object database. That means, the structure of the created variables is already defined and all parameter entries are preset. For Ethernet POWERLINK conform devices one has to define at least the objects:

- Device Type (1000_h)
- Identity Object (1018_h)

and more.

The Ethernet POWERLINK standard requires these objects.

There are special menus for the creation of communication parameter. These can be reached via the button *Add new Communication Service* in the action menu of the *Communication Segment*.

For each Ethernet POWERLINK service e.g. PDOs these menus are prepared. On this menus the user has only to make design decisions. No knowledge about the encoding and the contexts between communication objects is necessary.

4.4.1. Parameterization

For parameterization of communication variables the mask view can be used. With these forms the parameterization of more complex data like PDO parameter and PDO mapping is very easy.

4.5. Generation of source code

When the button *Generate* is pressed the object dictionary implementation in C-code the initialization and configuration files and furthermore an EDS resp. ESI file for each POWERLINK line **(**<*ProjectName*>*line*<*lineNo*>**.eds** and if activated a documentation **(**<*project name*>**.html)** are generated. These files are always consistent and contain the date and the time of generation. Another file **(generate.err)** contains warnings and errors. It is recommended, to have a look to this file by means of *Show* after each generation.

4.6. %-Variables

%-variables can be used in object names and variable names of indices and object names of sub-indices. In the file **objects.c**, in the EDS files and in the documentation and also in the object tree they are replaced by their current values.

Name	Description
%i	number of the index
%s	number of the sub-index
%l	number of the line
%f	number of the service (SSDO, CSDO, RPDO, RPDO-Mapping, TPDO-Mapping, SRDO, SRDO-Mapping) starting at 1
%p	(index - start of segment) starting at 0
%q	(index - start of segment + 1) starting at 1
%u	(index - start of sub segment) starting at 0
%v	(index - start of sub segment + 1) starting at 1
%t	short name of data type

Table 5, %-variables

When using lower case letters for the variables a decimal value is returned. Otherwise a hexadecimal value without leading "0x". Variables that are undefined in the current context (e.g. %s at an index) return an empty string.

Examples für the usage of these %-variables can be found at the SDO or PDO objects in the communication profile.

4.7. {}-Expressions

The {}-expressions allow the usage of %-variables and mathematical operators. Inside of the braces %-variables, constants (decimal/hexadecimal) and the operators + - * and / can be used.
Examples for valid object names with {}-expressions:

- output {%i - 0x100}
- state {%p + 100} at device %l

4.8. Post-Generation command

At *Generation* → *Post-Generation Settings* the post-generation command can be configured. The post-generation command is executed after the generation of the output files. The command may be a shell-script or a batch file, or you may run e.g. 'make all' or start an arbitrary executable file (e.g. the EDS checker or your compiler). The output of the command is written into the file generate.err.

5. Generation of user-specific object descriptions

The Design Tool provides format descriptors for the generation of user-specific object descriptions in ASCII-format for different document types.

The description template is a text in ASCII-Format including format descriptors for object-specific information and has to be stored in file list.conf in the working directory. During the generation of all files the description template is applied to each object. The Design Tool stores the object list in the file userList.txt in the working directory.

5.1. Format descriptors

The Design Tool supports the following format descriptors:

format descriptor	description
%a	access type: RO, WO, RW, RWW, RWR, CONST
%D	refuses write on download: 0 - not valid, 1 - valid
%d	data type according to CiA-309-3 (example: u32)
%e	EDS name of the object index
%F	default value in EDS valid: 0 - not valid, 1 - valid
%g	size in bytes in decimal format (example: 12)
%I	object index in hexadecimal format without prefix (example: 1A00)
%i	object index in decimal format (example: 4096)
%L	line number in hexadecimal format without prefix (example: A)
%l	line number in decimal format (example: 12)
%M	limits in EDS valid: 0 - not valid, 1 - valid
%m	lower (minimum) limit • for numerical objects: in hexadecimal format with prefix "0x" (example: 0xFFFFFFFF) • for string objects: <empty string>
%n	name of the object index in C code
%p	PDO mapping allowed: 0 - not valid, 1 - valid
%O	refuses Read on scan: 0 - not valid, 1 - valid
%R	valid after reset: 0 - not valid, 1 - valid
%S	sub-index in hexadecimal format without prefix (example: A)
%s	sub-index in decimal format (example: 12)
%T	description of the object Take note that the Design Tool can not convert special characters because it does not know the desired document type.

format descriptor	description
%U	upper limit • for numerical objects: in hexadecimal format with prefix "0x" (example: 0xFFFFFFFF) • for string objects: <empty string>
%u	unit (example: 100 ms)
%V	default value • for numerical objects: in hexadecimal format with prefix "0x" (example: 0xFFFFFFFF) • for string objects: without quotation tags (example: Test string)
%v	default value • for numerical objects: in decimal format (example: 1614872592) • for string objects: without quotation tags (example: Test string)
%z	enumeration counter of the object in decimal format, counting starts with 0 (example: 12, i.e. it is the 12th object)

Table 6, format descriptors

5.2. Example for HTML documentation

Each object in the object dictionary is listed with index, sub-index in bold text style and the object description. The following example only refers to object 1000h and 1001h.

list.conf:

```
<p>
  <b> object %Ih/%S </b>: %T
</p>
```

userList.txt:

```
<p>
<b> object 1000h/0 </b>: The device type specifies the kind of device. The lower 16 bit contain the device profile number and the upper 16 bit an additional information.
</p>
<p> <b> object 1001h/0 </b>: The error register is a field of 8 bits, each for a certain error type. If an error occurs the bit has to be set: Bit 0 generic error, Bit 1 current, Bit 2 voltage, Bit 3 temperature, Bit 4 communication error (overrun, error state), Bit 5 device profile specific, Bit 6 reserved, Bit 7 manufacturer specific
</p>
```

indication in the web-browser:

object 1000h/0: The device type specifies the kind of device. The lower 16 bit contain the device profile number and the upper 16 bit an additional information.
object 1001h/0: The error register is a field of 8 bits, each for a certain error type. If an error occurs the bit has to be set: Bit 0 generic error, Bit 1 current, Bit 2 voltage, Bit 3 temperature, Bit 4 communication error (overrun, error state), Bit 5 device profile specific, Bit 6 reserved, Bit 7 manufacturer specific

5.3. Example for Tcl scripts

A list of all objects is created. The entry for each object starts with a comment including the enumeration counter. The enumeration counter is also used as list index for the list objTab. The index, sub-index and the default value are listed for each object. The following example only refers to object 1000h and 1001h.

list.conf:

```
#object %z
set objNum %z
set objTab($objNum,indexHex)      0x%I
set objTab($objNum,subHex)        %S
set objTab($objNum,defValHex)     "%V"
```

userList.txt:

```
#object 0
set objNum 0
set objTab($objNum,indexHex)      0x1000
set objTab($objNum,subHex)        0
set objTab($objNum,defValHex)     "0x00000000"
#object 1
set objNum 1
set objTab($objNum,indexHex)      0x1001
set objTab($objNum,subHex)        0
set objTab($objNum,defValHex)     "0x00"
```

The generated object list can be used after sourcing in a Tcl scripts - especially in the frame for testing in the Console of the CANopen Device Monitor.

6. Powerlink-Merge PlugIn

Powerlink-Merge provides functions to visualize and modify differences between different POWERLINK Design Tool projects. The Powerlink-Merge extension module is an optional PlugIn which is activated by the license file of the POWERLINK Design Tool. If a valid license is present, Powerlink-Merge can be started by the Powerlink-Merge menu in the menu bar of the POWERLINK Design Tool.

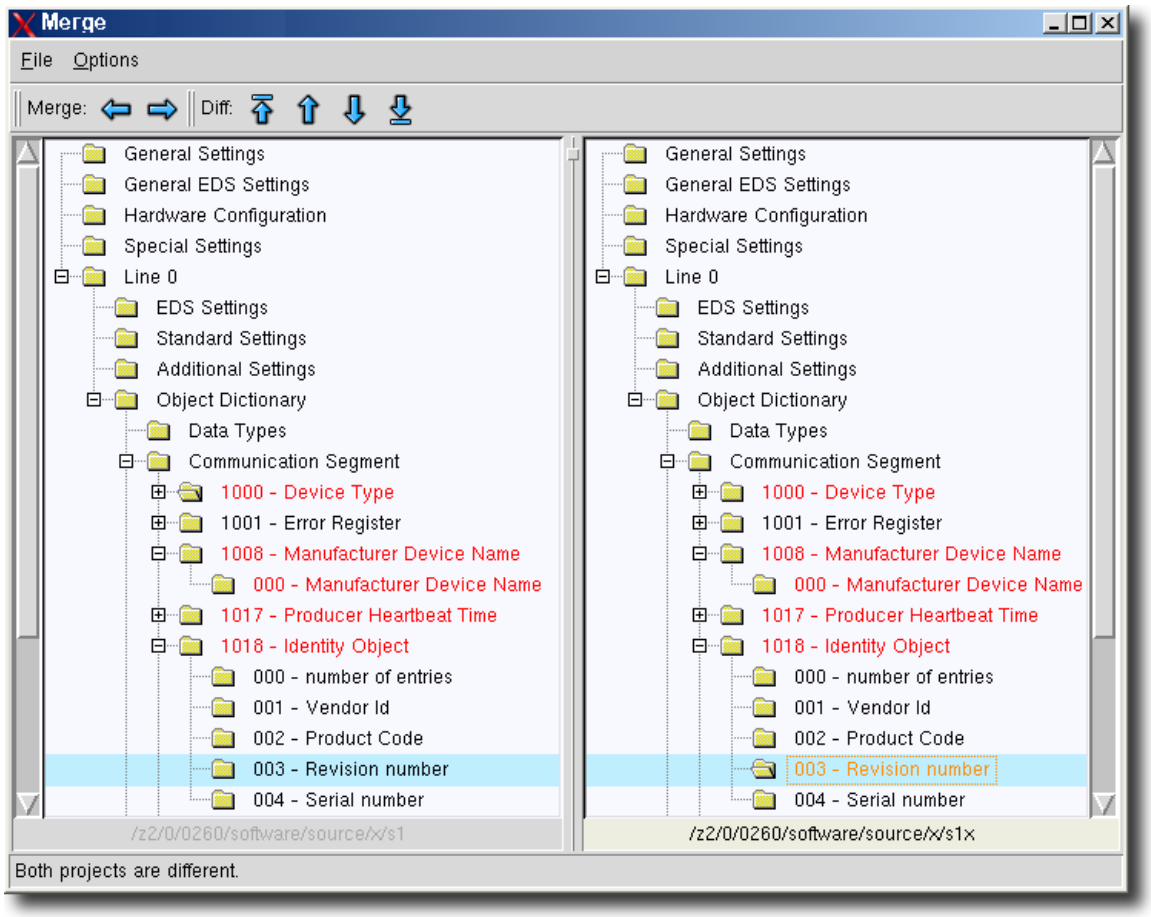


Figure 9, Powerlink-Merge main window displaying 2 projects

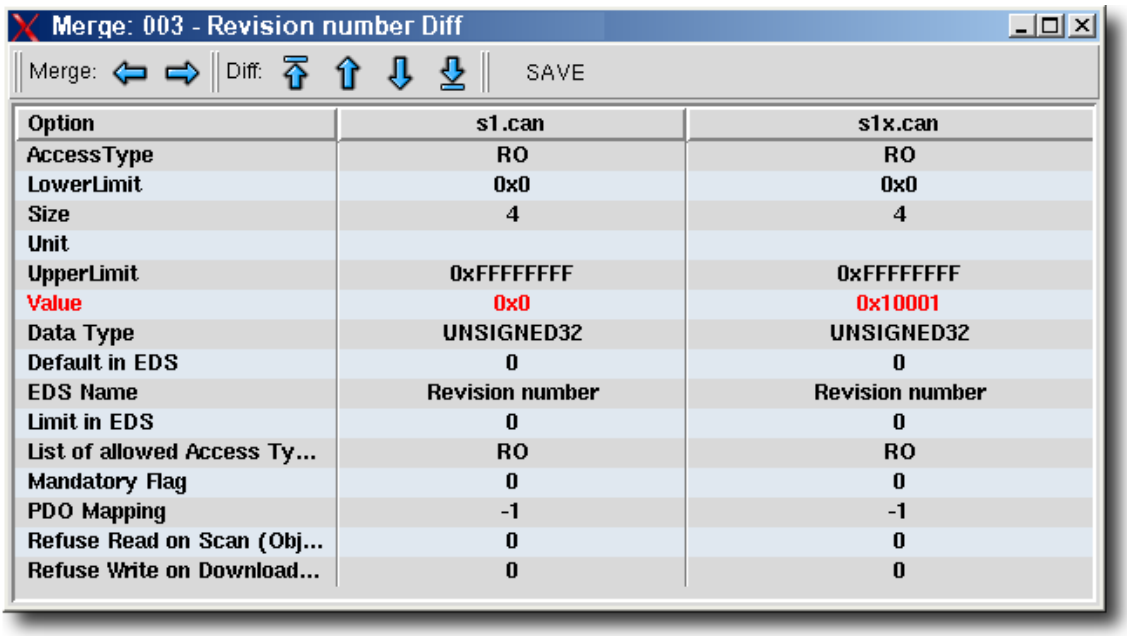
6.1. Project View

The project view shows different settings, sub segments, objects and sub indices with different colors. By using the *Merge* function in the tool bar these elements can be copied from one project into the other one.

Via the menu *File* the modified projects can be saved to disk or imported into the POWERLINK Design Tool. The menu entries like *Save* resp. *Open* refer to the active project tree. Via *Generate Diff Report* an overview about the differences between the projects can be generated. This diff report is an XML file containing all differences.

Via *Options* several settings can be configured. These include the attributes to be compared or merged and further options.

6.2. Detail View



Option	s1.can	s1x.can
AccessType	RO	RO
LowerLimit	0x0	0x0
Size	4	4
Unit		
UpperLimit	0xFFFFFFFF	0xFFFFFFFF
Value	0x0	0x10001
Data Type	UNSIGNED32	UNSIGNED32
Default in EDS	0	0
EDS Name	Revision number	Revision number
Limit in EDS	0	0
List of allowed Access Ty...	RO	RO
Mandatory Flag	0	0
PDO Mapping	-1	-1
Refuse Read on Scan (Obj...	0	0
Refuse Write on Download...	0	0

Figure 10, Powerlink-Merge diff window displaying differences of 2 sub indices

The detail view displays differences of global settings, indices and sub indices. Attributes of indices and sub indices can be modified directly within this view. Modifications have to be confirmed by the button *SAVE* in the tool bar. A plausibility check is performed when saving these settings.

7. CSV-Import PlugIn

7.1. Usage

With the CVS Import PlugIn objects of the object dictionary can be imported from CSV files. Thus it is possible to export object definitions from other sources (e.g. data bases) as a CSV file and import it into the POWERLINK Design Tool.

The format of the CSV file can be specified using an *Input Description Specifier*. It allows to select only some columns of a csv file. Additionally, an object offset can be speficied for the import.

The CSV Import extension module is an optional PlugIn which is activated by the license file of the POWERLINK Design Tool. If a valid license is present, CSV Import can be started by the CSV Import menu in the menu bar of the POWERLINK Design Tool.

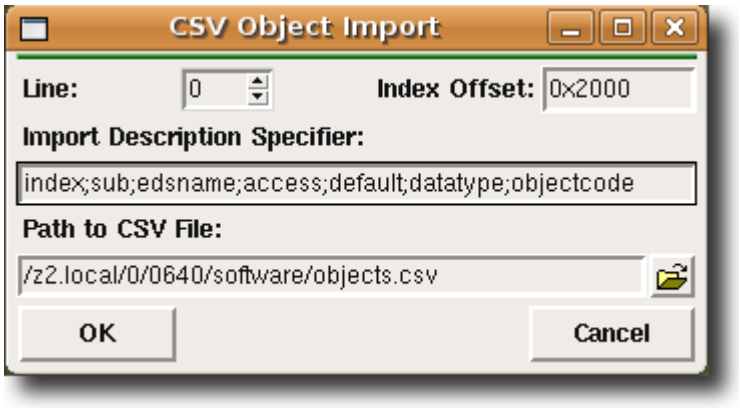


Figure 11, CVS-Import configuration mask

The following table describes all tokens that can be used for the Input Description Specifier and their value range for the corresponding column in the CSV file. Commas, semicolons or tab stops can be used as separator between the tokens, but only one of them.

Element	Value range
index	index in the range between 0x2000 and 0x9FFF
sub	sub index in the range between 0 and 254
edsname	arbitrary string
varname	valid C variable name
access	RO, RW, WO, CONST, RWR, RWW or as lower case letters
unit	arbitrary string
min,max,default	numbers using C notation
datatype	Ethernet POWERLINK datatype as decimal number (see object dictionary)
objectcode	VARIABLE (default), ARRAY or SUB
desc	arbitrary string only for VARIABLE or ARRAY
createvar	flag if the c-variable shall be created (0 or 1)

Element	Value range
pdomapping	flag if it can be mapped into a PDO (0 or 1)

7.2. Examples

This examples shows a standard configuration of manufacturer specific objects.

Input Description Specifier:

```
index,sub,varname,edsname,unit,access,min,max,default,datatype, \
objectcode,createvar,pdomapping
```

CSV File:

```
0x3000,0,man_eins,EDSName_1,,ro,0,0xff,0xF0,5,VARIABLE,1,0
0x3001,0,man_zwei,Variable_2,,ro,0,0xff,0xF0,5,VARIABLE,1,0
0x3002,0,man_drei,Ohne_Create_Var,,ro,0,0xff,0xF0,5,VARIABLE,0,1
0x4000,,min_array,Lufthupen,,rw,,,,6,ARRAY,0,0
0x4000,1,,Lufthupe_1,,wo,0,0xf1,0x01,6,SUB,1,1
0x4000,2,,Lufthupe_2,,ro,0,0xf2,0x02,6,SUB,1,1
0x4000,3,,Lufthupe_3,,rwr,0,0xf3,0x03,6,SUB,1,1
```

The next example shows how to ignore some columns from the CSV file.

Input Description Specifier:

```
;;;;index;;;varname;;;access;default;datatype;objectcode;edsname
```

CSV File:

```
whatever;;ign;;0x2001;0;0;test_1;;;ro;0;6;VARIABLE;Number of Inputs
whatever;;ign;;0x2002;0;0;test_2;;;ro;0;6;VARIABLE;Number of Outputs
whatever;;ign;;0x2003;0;0;test_3;;;ro;0;6;VARIABLE;Number of Variables
```

8. Different versions

8.1. Standard version

The standard version provides the functions as described herein.

8.2. Light version

In the light version the number of objects is limited to 30 per line. Using the light version it is not possible to generate output files, if a line consists of more than 30 objects.

8.2.1. Limitations

If the number of objects is below 30, all output files of the POWERLINK Design Tool are generated. If the limit is exceeded, the 'Light' version is only able to generate the library configuration file **pl_conf.h.**

8.2.2. Usage

If no future use of the project files in the standard version of the POWERLINK Design Tool is intended, only the following masks and input fields have to be completed:

- General Settings
- Hardware Configuration

To configure the Ethernet POWERLINK Library according to the used Ethernet POWERLINK services the following procedure is recommended:

- Create the desired lines
- In every line the communication segment has to be filled completely.

When the configuration is complete the file **pl_conf.h** can be created by *Generate all Files*. The project file of POWERLINK Design Tool light has to be saved too, because it is not possible to import the Library configuration from a **pl_conf.h**.
The project file can be reused in the standard version of the POWERLINK Design Tool.

8.3. POWERLINK XDD Editor

8.3.1. Limitations

The generation of the output files is limited to the XDD/EDS files and the documentation.

8.3.2. Usage

The is a reduced version of the POWERLINK Design Tool. Thus it is possible to use project files of the POWERLINK Design Tool to handle the data of the EDS files. Using the EDS/XDD files directly via "File → Import EDS/XDD file" and "Generate → Generate all files" is also possible.

If no future use of the project files in the standard version of the POWERLINK Design Tool is intended, only the following masks and input fields have to be completed:

- Device Description Settings
  - CharacteristicsList
  - Device Description Entries
  - Diagnostic Entries
- at the structure view of the indices:
  - EDS Name
  - Data Type
  - Object Code
  - Description (only for XDD parameter description and the documentation)
- at the structure view of the sub indices:
  - EDS Name (for arrays and records)
  - Data Type
  - Access
  - PDO Mapping
  - Value
  - Unit (only for the documentation)

Appendix 1 — Abbreviations

CAN	Controller Area Network
CAL	CAN Application Layer (CANopen base)
CiA	CAN in Automation international users and manufacturers group e.V.
COB	Communication Object (CAN Message)
COB-ID	Communication Object Identifier
DDE	Device Description Entry
EMCY	Emergency Object
EPL	Ethernet POWERLINK
EPSG	Ethernet POWERLINK Standardization Group
ESI	EtherCAT Slave Information XML device description for EtherCAT slaves
ETG	EtherCAT Technology Group
NMT	Network Management
PDO	Process Data Objects, they are messages in a unconfirmed service. They are used for the transfer of real-time data to and from the device.
RPDO	Receive PDO
SDO	Service Data Objects, they are messages in a confirmed service. They are used for the access to entries of the object dictionary.
CSDO	Client SDO
SSDO	Server SDO
SYNC	Sychronization Object
TIME	Time Stamp Object
TPDO	Transmit PDO
XDD	XML Device Description - device description files for POWERLINK or CANopen
XML	eXtensible Markup Language